

*“We want to produce tactically responsive space systems. What we want to be able to do is craft a payload, integrate it into a rocket, launch it and have it orbiting all within the timelines for the planning of a major contingency for the nation. We are talking about space capabilities in weeks and months and not decades.”*

Art Cebrowski, Director, Office of Force Transformation

## ***Operationally Responsive Space Experiment TacSat-1***

The Secretary of Defense's Office of Force Transformation (OFT) is currently undertaking an initiative, which seeks to provide operational responsive access to and the near term tactical exploitation of space. TacSat-1 is the first adaptive experiment in this initiative, which seeks to exploit access to space within the operational contingency planning cycle.

One of the objectives of TacSat-1, as well as the broader initiative, is to make space assets and their capabilities available to operational users. Additionally, OFT intends for the TacSat-1 experiment to generate policies where concepts and technology co-evolve, ultimately ensuring that space-based assets emerge as an organic part of the Joint Task Force.

The broader system characteristic toward responsive space constitutes an operationally relevant space capability that takes advantage of a highly automated micro-satellite bus, modular payloads, common interfaces, tasking and data dissemination using SIPRNET protocols (TCP/IP addressability), and low-cost, rapid-responsive launches. It will also investigate flawed and limited interactions where

failure is a significant data point. As a result, it is an initiative, which will explore and take advantage of emerging concepts, broadens the technology base and seeks to mitigate risk averse behavior.

OFT's Operationally Responsive Space Experiment is designed to provide a rapid, tailored, and operationally relevant experimental space capability to tactical forces. Tactical micro-satellites will also provide space-based assets that can assist in establishing a robust distributed tiered sensor network for tactical or operational tasking. TacSat-1 is the first satellite in the planned series scheduled for launch in early 2004.

### **TacSat-1 Objectives**

The overarching objective of this experiment is to provide and launch an operationally relevant micro-satellite, with the ability to task and disseminate data through existing operational networks (SIPRNET), in less than 1 year and for less than \$15M (to include launch costs).

Additionally, this experiment seeks to explore concept-technology pairings that develop near term paths for the tactical use of space in four key areas.

- a. Micro-satellite design and processing:
    - Includes utilization of UAV components tested for the space environment and contained within hermitically sealed, fan-cooled chassises.
  - b. Responsive, on-demand space lift, which;
    - Uses a new, commercial launch vehicle being developed with private capital and designed to compete within dynamic market conditions
    - Tailors formal DoD approaches of mission assurance and risk mitigation to rapid capability cycle times and the lower costs associated with micro-satellites.
  - c. Making space an organic part of the Joint Task Force
    - Direct tasking and data dissemination being performed both real-time from aircraft and time-latent (based on orbital positioning) via the SIPRNET.
    - Tailored payloads and inclinations demanded by regional or operational commanders.
  - d. Developing space professionals and the processes needed for responsive space
- Providing incentives that maintain a strong government-industry team to broaden space access capabilities and implement operational experiments at far higher rates.

### **TacSat-1 Payload Capabilities**

TacSat-1 payloads will provide the following experimental capabilities:

- a. Machine-to-machine collaboration between Air and Space assets for geo-location.
- b. Tactical control of payload and dissemination of data through SIPRNET.
- c. Specific sensor discrimination capability.
- d. SIPRNET tasking and data dissemination of an *Infrared Camera* utilizing a new thermal imager (non-cryogenically cooled microbolometer FPA), thereby significantly reducing complexity (size, weight and power).

- e. SIPRNET tasking and data dissemination of a ***Visible Camera*** primarily to provide modest resolution but intuitive pictures for collective collaboration by an expanded user base.

#### **TacSat-1 Key Partnerships**

- a. Navy Research Lab: Program Manager and integrator of the micro-satellite and responsible for TacSat-1 mission design and implementation.
- b. Air Force Space Command
  - a. Space and Missile Center (SMC) is providing mission oversight for the booster.
  - b. 30<sup>th</sup> Space Wing providing the launch facility, launch services, and operates the Western Range in support of the launch
- c. TacSat-1 capitalizes on NASA's Virtual Mission Operations Center (VMOC) for SIPRNET payload tasking and data dissemination. VMOC is also being adopted and experimented by AF and Army Space Battlelabs for spacecraft/SIPRNET interface.
- d. NRO Office of Space Launch is providing the payload processing facility at Vandenberg Air Force Base.
- e. Regional Combatant Commanders providing operational experimentation and coordination.
- f. Space-X is on contract for launch of TacSat-1 in early 2004 aboard the inaugural flight of their Falcon Launch Vehicle.